ORAL CANCER DETECTION USING MOBILEAPPLICATION

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KEYWORDS:

INTRODUCTION:
Systemic problems those that affect the entire body many times appear in the mouth first. In general, mouth is a good indicator of what’s going on in the body, which is why the physicians for generations have asked patients to open their mouth. The discovery of a wound in the mouth indicates so many problems in the Human Body and despite advances in surgery, radiation and chemotherapy, the mortality rate associated with oral cancer has no improvement in the last 40 years. Eventually, 50 percent of people who have oral cancer die because of the malignancy.

Oral cancer is one among the cancer which affects both men and women. This work presents the detection of oral cancers using Image Processing in an android application. Dental X – Rays are used as the input image for detection. At first, linear contrast stretching is used to remove noise from the Dental X – Ray Image. Watershed Segmentation is used to segment tumors from the enhanced image. Based on affected area stage of the cancer will be identified in android application.

OBJECTIVE:
1. To make the detection of oral cancer easier for the doctors and also accurate.
2. To implement image processing methods in the android application by using x-rays
3. To implement the recent advances in technology to make the diagnosis of cancer more digital.
4. To help the people who cannot afford the expensive tests for the detection of the malignancy of the cyst.

METHODOLOGY:
The requirements of the system are as given below:

Hardware Requirements
Processor : 800MHz+ Processor
Ram : 256 Mb+
Android Device : android 4.4 version device or above
Mouse : Logitech
Hard disk : 4 GB+
**Software Requirements**

- Operating System: Windows 7
- Programming Language: Java
- Front End: XML
- Back END: SQLite
- IDE: Android Studio

![Fig 1: block diagram of the system](image)

The basic process included in building the application are:

**A. Reading X-ray image**

In this module, the android application is reading the x-ray images to find out presence of oral cancer. In android bitmap concept is used to handle images. A bitmap is simply a rectangle of pixels. Each pixel can be set to a given color but exactly what color depends on the type of the pixel. The first two parameters give the width and the height in pixels. The third parameter specifies the type of pixel you want to use. Fig 3.1 shows how the x-ray image is processed to detect tumor.

**B. Removing unwanted details**

In this process, apart from tooth and gum area other areas will be avoided in order to concentrate only the area that will be affected by cancer where the tumor is present. By doing this unwanted information from the x-ray image is removed.

**C. Detecting affected area**

This process aimed to identify detecting the areas which are affected by cancer disease. Image segmentation is used for this identification. Image segmentation is the process of partitioning a digital image into multiple segment. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image. After segmentation watershed process is applied on segmented image to extract the location of affected cells.
D. Diagnosing Stage of tumor

In this module, the stage of the cancer is detected and is displayed on the screen. The stage is predicted based on the area that the tumor accumulates in the mouth.

RESULTS AND CONCLUSION:

The proposed work would have extensive applications in the field of medicine mainly oncology. The application can be used easily by anyone who possesses a smartphone. In the proposed application user will be consider as an actor who is going to perform these following set of actions

- Loading image:
  In this use case user have to select dental X-ray image from his gallery to process that image. For loading image into application intent is triggered in android application. As a result, Intent will load the selected image into imageview.

- Grayscale conversion:
  A grayscale digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest. Grayscale images are distinct from one-bit bi-tonal black-and-white images, which in the context of computer imaging are images with only two colors, black and white (also called bi-level or binary images). Grayscale images have many shades of gray in between. Grayscale images are often the result of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum.
  In our work even though we are using dental x-ray images some noise will be there in that images. So to avoid that noise/error on that image we are converting that image into grayscale image.

- Edge detection:
  Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.
  In our work to detect the areas such as teeth, gum and background of x-ray we have to segment the image. In that process edge detection is used to identify the edges on image.

- Gradient magnitude:
  An image gradient is a directional change in the intensity or color in an image. Image gradients may be used to extract information from images. After gradient images have been computed, pixels with large gradient values become possible edge pixels. The pixels with the largest gradient values in the direction of the gradient become edge pixels, and edges may be traced in the direction perpendicular to the gradient direction. In our work to differentiate exact position of affected area and background area this magnitude is used. Edges on gum area will be considered as affected cells.

- Extraction of affected area:
  In this case cancer affected areas will be identified and based on the coverage of affected area cancer stage will be identified.
SCOPE AND FUTUREWORK:

This project provides wide scope for enhancing the capability of the application. The application can be further enhanced to detect the presence of cancer through normal images. The accuracy of the application can also be improved by testing using a lot more images of malignant tissues.